



FEP3301 Computational Game Theory 8.0 credits

Spelteori

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FEP3301 valid from Autumn 2012

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

Upon completion of the course, the student should be able to:

- formalize problems that involve more than one decision making entity in a game theoretical context

- critically assess the research literature in the area
- use the game theoretical tools and methods to solve problems
- contribute to the research frontier in the area

Course contents

Strategic games in normal form, Kakutani's fixed point theorem, best reply, Nash equilibrium, dominance solvability, rationalizability, existence of equilibria, zeros-sum games, minimax theorem, cardinality of solutions, refinement of Nash equilibria, robustness of equilibria, Bayesian games, potential games, submodular games, extensive games with perfect information, subgame perfect equilibria, repeated games and folk theorems, stochastic games, Markov perfect equilibria, finite and infinite evolutionary games, replicator dynamic, evolutionary stable states and sets, coalition games, core, kernel, nucleolus, Shapley value, social choice theory, Arrow's impossibility theorem, implementation in dominant strategies, strategyproof implementation, Gibbard-Satterthwaite theorem, implementation with money, Groves mechanism, Clarke's pivot rule, VCG mechanism, implementation in Nash equilibrium.

Disposition

Lectures, homework problems, presentations on selected topics by the participants, 72 h take home exam

Course literature

Parts of the course topics are covered in the book

M. J. Osborne, A. Rubinstein, "Course in Game Theory", MIT Press, Cambridge, Mass., 1994
Alternative: D. Fudenberg, J. Tirole, "Game theory", MIT Press, Cambridge, Mass., 1991

Lecture notes will be available on the course home page. A list of relevant research and overview articles will be provided.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

15 min oral presentation at one of the lectures

75% on weekly home-work problems and the presentation

50% on 72 h take home exam

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.